



Search for Earth-like planets includes LANL star analysis

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NASA Kepler spacecraft set to launch today

LOS ALAMOS, New Mexico, March 6, 2009—The Kepler space telescope is set to launch today from the Kennedy Space Center in Florida at about 8:50 p.m. MST, and a group of scientists at Los Alamos National Laboratory will be watching with keen interest. Four stellar seismologists at the Laboratory are part of the Kepler Asteroseismic Science Consortium, a large, multinational team that will analyze the vast quantity of data expected from the mission.

Using Kepler, NASA expects to answer a very fundamental question: do planets the size of Earth exist in orbit around other stars? The Kepler Spacecraft is equipped with a large telescope that will measure the variations in brightness of 170,000 stars simultaneously and continuously for a period of at least 3.5 years.

The mission will not only be able to search for planets around other stars, but also yield new insights into the parent stars themselves. Kepler's measurements of changes in stellar brightness can also be used to study stars and their interiors.

Consortium team members at Los Alamos include Joyce Ann Guzik, Paul Bradley, Arthur N. Cox, and Kim Simmons. They will help interpret the stellar oscillation data through computational modeling of the evolution, structure, and pulsations of observed stars. Guzik, Bradley, and Cox are members of working groups for modeling sun-like stars, as well as for other types of variable stars that are somewhat more massive than the sun and are burning hydrogen in their cores, known as the beta Cephei, slowly pulsating B stars, delta Scuti, and gamma Doradus stars.

In addition, Bradley will be working with data on white dwarf stars. Guzik, along with collaborators Bernie McNamara and Jason Jackiewicz from New Mexico State University in Las Cruces, have submitted several NASA proposals for stellar observations using Kepler and for follow-up asteroseismology analyses.

Los Alamos has been a leader in the field of stellar pulsations for many years; in late May this LANL team is hosting the 19th in a series of international stellar pulsation conferences initiated at Los Alamos in 1971. The conference will be held at La Fonda Hotel in Santa Fe, May 31-June 5. For more information see the conference Web site at www.lanl.gov/conferences/stellar_pulsation online.

The quality of the Kepler data and the large number of stars observed are expected to lead to a huge step forward in understanding stellar evolution. During the first nine

months in space, Kepler will survey more than 5000 stars for oscillations. Based on those measurements around 1100 stars will be followed for detailed studies throughout the full mission. The accuracy with which Kepler will be able to measure stellar oscillations is so high that the science team expects to watch directly the change in stars as they age.

In order to allow scientists worldwide to participate in analyzing the huge dataset, a scientific consortium has been formed, aiming at maximizing the scientific use of the data. This consortium, Kepler AsteroSeismic Science Consortium, includes more than 200 researchers from 50 institutions all over the world, including Los Alamos.

About the mission:

Kepler is a NASA Discovery mission. NASA's Ames Research Center is the home organization of the Science Principal Investigator and is responsible for the ground system development, mission operations and science data analysis. Kepler mission development is managed by JPL. Ball Aerospace & Technologies Corp., Boulder, Colo., is responsible for developing the Kepler flight system and supporting mission operations. More information about the Kepler mission is at <http://www.nasa.gov/kepler>

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